App. No. 10/001,279
Amendment Dated June 14, 2005
Reply to Final Office Action of April 21, 2005

REMARKS/ARGUMENTS

Claims 1-20 remain in this application for further review. Independent claims 1, 15 and

20 have been amended for clarification purposes. The cited references are related to a

completely different invention than the claims of the present invention. In hopes of expediting

the prosecution of this matter, applicants' attorney would welcome an interview with Examiner

Kendall to discuss any outstanding issues with this response. No new matter has been added.

I.   Rejection of Claims 1-5 and 8-20 Under 35 U.S.C. 102(b)

Claims 1-5 and 8-20 were rejected under 35 U.S.C. 102(b) as being anticipated by United

States Patent No. 5,450,589 issued to Maebayashi et al. ("Maebayashi"). Applicants respectfully

disagree with the rejections and arguments set forth in the Office Action. However, in order to

clarify the invention and expedite this matter, applicants have made the above amendments for

clarification purposes. Independent claim 1 specifically recites at least the following limitations

that are not taught or otherwise suggested by Maebayashi:

> "*obtaining a system reference to an online target system* on which the heterogeneous program is executing"

> "*locating a component of the heterogeneous program* based on the program reference, the component residing in a target system memory associated with the *online target system*"

> "inserting the modified executable code into *the target system memory without taking the online target system offline*"

Independent claim 15 specifically recites at least the following limitations that are not

taught or otherwise suggested by Maebayashi:

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"a computerized system for modifying a heterogeneous program associated with an *online target system without taking the target system offline*"

"a dynamic modification process executing in the processing unit for modifying an executable code in a target system memory based on the modified intermediate representation *without taking the target system offline*, the executable code being associated with the heterogeneous program"

Independent claim 20 specifically recites at least the following limitations that are not

taught or otherwise suggested by Maebayashi:

"a computer-readable medium having computer-executable components *for modifying an online target system without taking the target system offline*"

"a dynamic modification process configured to modify an executable code in the target system memory based on the modified intermediate *representation without taking the target system offline*, the executable code being associated with the heterogeneous program"

As examples of some of the problems in the prior art, the specification of the present

invention specifically recites as follows:

"In the past, when a computer experienced a problem with one of its applications while running online, the computer was taken *offline to simulate the problem*. However, with the advent of the Internet, computers *cannot be taken offline so readily in order to identify the problem*. Typically, these computers are running numerous applications and are servicing several requests from different Internet users at any one time. Therefore, *it is undesirable for these computers to be taken offline*. Rather, it is desirable for these computers to remain operational (i.e., "live") at all times. Thus, these computers are commonly referred to as "live" systems." *Background of the Invention*, at p. 1, lines 8-15 (emphasis added).

"*Even if it were allowable to take these computers offline*, there would still be problems with diagnosing the problem offline. For example, the problems occurring online are typically related to the loading and unique circumstances of the computer at the time the problem occurred. Thus, if the computer were taken offline, the problem would disappear. In addition, for computers operating in a heterogeneous distributed computing environment, the problem *is even more difficult to diagnose offline*. These computers in this distributed computing

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environment may have various architectures and run various operating systems. The applications on these computers may have heterogeneous components that have routines in different instruction sets (i.e., Intel x86, Intel IA-64, Visual Basic (VB) byte code, Java class files, and other Virtual Machine (VM) binary). In addition, the heterogeneous components may be operating on different computers. Thus, it is difficult to generate a test scenario that has the same distribution of applications and components and has the same loading. *Therefore, offline testing of computers is not very successful in duplicating and solving problems occurring on computers operating on the Internet."* *Background of the Invention*, at p. 1, line 16-p.2, line 2. (emphasis added).

As examples of some of the advantages over the prior art the specification of the present invention specifically recites as follows:

> "Briefly stated, the present invention enables the analysis, modification, and insertion of code into a *heterogeneous program that is executing in a distributed computing environment*. The analysis, modification, and insertion of code occur *without taking any computing device offline*. In accordance with the present invention, modified code may be patched over original instructions of the heterogeneous program or may be injected into another portion of memory. When the modified code is injected into another portion of memory, the execution of the heterogeneous program is redirected to this other portion of memory. The modified code may be user mode code or kernel mode code. These and other aspects of the invention will become apparent to those skilled in the art from the following detailed description." *Detailed Description of the Preferred Embodiment*, at p. 4, line 23-pg. 5, line 2 (emphasis added).

The portion of the specification cited above is but one example from the specification of the purposes and advantages of the present invention over the prior art. These citations are for explanatory purposes only and not meant to impute any limitations into the claims apart from the claim language itself insofar as applicants assert that the terms of the claims are clear.

Applicants can find no teaching or suggestion in Maebayashi of the element "without taking the target system offline" as specifically recited in the independent claims. Moreover in specific regard to the portions cited in the current Office Action, those portions do not teach or suggest the elements propounded. The Office Action cites to Maebayashi, column 1, lines 55-65

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as teaching dynamically modifying and executing a heterogeneous program. However, the

relevant portions of column 1 specifically recite as follows:

> "An object of the present invention is to provide a firmware modification system
> of a data processing apparatus wherein a modification of firmware can be carried
> out fast and easily even when the data processing apparatus is located in a remote
> place, or when the modification must be carried out in a large number of data
> processing apparatuses, and program data of an older version can be retrieved
> when the modified program data is not successfully executed." *Maebayashi*, at
> col. 1, lines 51-59.

> "According to the present invention, there is provided a firmware modification
> system in a data processing apparatus, comprising: a processor for executing a
> program; a working program holding unit for holding therein data *of the program
> executed by the processor*; a fixed program data storing unit for storing a fixed
> program...." *Maebayashi*, at col. 1, lines 60-66 (emphasis added).

Applicants assert that the above language of Maebayashi cannot be interpreted as

teaching *dynamically modifying and executing a heterogeneous program*. In fact, Maebayashi

is related to an entirely different invention than the present invention. Maebayashi teaches a

modification system wherein older versions of a modification are retrievable when an updating

or debugging fails. *Maebayashi*, at col. 1, lines 50-60. One of the problems in the prior art, as

set forth by Maebayashi, is that in relatively small-scale data processing systems firmware is

written or stored in advance in a ROM. *Maebayashi*, at col. 1, lines 31-37. Therefore, the ROM

must be replaced with a new one when the firmware is to be modified or debugged.

Maebayashi, at col. 1, lines 35-37. Also, if the debugging or modification fails, the ROM must

then again be replaced (old versions of a modification cannot be recaptured). *Maebayashi*, at

col. 1, lines 44-50.

In order to remedy these problems, Maebayashi teaches a plurality of storage units that

maintain various versions of modified and unmodified program data. *Maebayashi*, at col. 1, line

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60-col. 3, line 35; col. 4, line 47-col. 5, line 19. These versions are then accessible in case a

debugging or update fails and the user needs to revert to a prior version of the program.

Maebayashi, at col. 4, line 64-col. 5, line 3. Maebayashi is simply teaching storage and retrieval

units for various versions of a program to make updating and debugging more user friendly when

a failure occurs. Maebayashi does not teach a method of modifying and executing a

heterogeneous program.

Furthermore, as noted in the Office Action, Maebayashi teaches an "address"; however,

the address refers to the data associated with each block for each version. "[E]ach block for each

version contains: an address of each data to be modified; new data of the address for the version;

and old data of the address for a version older than the version of the block by one version

level...." *Maebayashi*, at col. 2, lines 64-67. The address for the various versions is stored so

that a data comparing unit, before modifying the data in the working program holding unit, can

compare the address of the old data and the address of the data in the working program holding

unit. *Maebayashi*, at Col. 3, lines 3-7. Maebayashi does not teach "obtaining a program

reference to the heterogeneous program based on the system reference." Accordingly, applicants

assert that independent claims 1, 15 and 20 are allowable over Maebayashi.

Regarding claims 2-5, 8-14 and 16-19 of the present invention, those claims ultimately

depend from independent claims 1 and 15, respectively. Inasmuch as claims 2-5, 8-14 and 16-19

ultimately depend from independent claims 1 and 15, respectively, the same are also thought to

be allowable for at least those same reasons.

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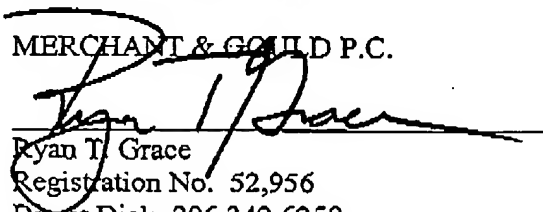## II.   Rejection of Claims 6 and 7 Under 35 U.S.C. 103(a)

Claims 6 and 7 were rejected under 35 U.S.C. 103 as being unpatentable over

Maebayashi in view of U.S. Patent No. 6,463,583 B1 issued to Hammond ("Hammond").

Applicants respectfully disagree with the rejection. There is no suggestion in any of the

references that they may be modified in the manner suggested. Also, even if for argument

purposes such a modification could be made, the cited references still fail to teach all the

limitations of the claims. Furthermore, the 35 U.S.C. 103 rejection depends from the above

stated 35 U.S.C. 102(e) rejection. The claims are clearly allowable under 35 U.S.C. 102(e) and

therefore, the 35 U.S.C. 103 rejection should be withdrawn.

III.   Request for Reconsideration

In view of the foregoing amendments and remarks, all pending claims are believed to be

allowable and the application is in condition for allowance. Therefore, a Notice of Allowance is

respectfully requested. Should the Examiner have any further issues regarding this application,

the Examiner is requested to contact the undersigned attorney for the applicants at the telephone

number provided below.

Respectfully submitted,

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